

Work Order ID 135092

135092

Page 1

July 29, 2015 7:47:17 AM

Item ID: D412-664-209

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Aft Crosstube - Low Standard

Start Date: 7/29/2015 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 8/12/2015 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: SW Date: 20150729 Pooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D412-664-249	C								
100	Document Control	0.00							DAS
100	DOCUMENT CONTROL								02
DC	Memo	0.00							9-89
Doc.Control -USB or Paperwork	Photocopy bluefile and create labels as per PPP D412-664-209 CHG005								AUG 10 2015
110	Packaging	0.00							
110									
Packaging	Memo	0.00							
Packaging									
120	BENDING MACHINE - CROSSTUBES	0.00							
120									
CNC Bend 2	Memo	0.00							
CNC Alpha 160 Bender	Bend tube as per Dwg D412-664-249 using CNC bender program and Folio FT								

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date : _____	Step #: _____	QTY Effective : _____		MRB (QS1042) Approval	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
OTHER : _____					

Work Order ID 135092

135092

Page 2

July 29, 2015 7:47:17 AM

Item ID: D412-664-209 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: Stop ***NS2***
Item Name: Aft Crosstube - Low Standard
Start Date: 7/29/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 8/12/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
130						1			EB
QC	Memo	0.00							15-07-30
Quality Control									
140	Crosstubes	0.00							
140						13			15/07/30
Crosstubes	Memo	0.00							
Crosstubes	***** ENSURE PROPER JIG POSITIONING *****								
	1-Drill Rivet holes as per Dwg D412-664-249 .								
	2-Drill pilot holes in tube as per Dwg D412-664-249								
	3-Ream hole to finish size in tube as per Dwg D412-664-249								
	4-*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Deburr & Inspect for surface damage. Repair damage within limits as per Dwg .								
	D412-664-249								

— 13C

15/08/04

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date : _____	Step #: _____	QTY Effective : _____		MRB (QS1042) Approval	
Description Work Order Deviation			Disposition		
			Completed By		
			Lead hand / Supervisor Approval Verification		
			QC / QA Coordinator Approval		
Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
OTHER : _____					

Work Order ID 135092

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Page 3

July 29, 2015 7:47:17 AM

Item ID: D412-664-209 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: Stop ***NS2***
Item Name: Aft Crosstube - Low Standard
Start Date: 7/29/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 8/12/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 *150* QC Quality Control	QC5- Inspect part completeness to step on W/O Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***	0.00 0.00				1	Ø		DAS 49 9-89 15/08/04
160 *160* HandFXtube Hand Finishing Crosstubes	Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** 1- CLEAN CROSSTUBE WITH WASH'N WIPE	0.00 0.00				1			DAS 41 9-89 15-8-5
180 *180* Outsource2 Outsource process - NDT	Outsource process - NDT per QSI038 4.1 Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Liquid Penetrant Inspection as per QSI 038 Issue P/O: 29377 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order	0.00 0.00				CZ		AUG 05 2015	1

P/O: 29396

CZ

AUG 06 2015

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐																																																													
Date :		Step #:		QTY Effective :			MRB (QS1042) Approval																																																										
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Root Cause		FAULT CATEGORY																																																															
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐	Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐	Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐	Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐	Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐	Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐	Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐	Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐	LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐	Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐	Past Expiry Date ☐	Manufacturing Process ☐	OTHER :			
Misidentified ☐	Past Due ☐																																																																

Work Order ID 135092

July 29, 2015 7:47:17 AM

135092

Page 4

Item ID: D412-664-209

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube - Low Standard

Start Date: 7/29/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/12/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190	Packaging	0.00							
190									
Packaging	Memo	0.00							
Packaging	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
200									
QC	Memo	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Inspect for damage & ensure results are as per Dwg D412-664-209								
204		0.00							
204									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1- PRESSURE WASH AND THEN USE WASH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION								

1X 8/15-08-05
1X 8/15-08-06

DAS
38
9-89

AUG 06 2015

DAS
41
9-89

15-8-6

DQA:

Date:

15/09/02

Pink NCR!



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed:

Date:

15/09/02

Work Order update only

Work Order: <u>135092</u>		DISPOSITION		AGAINST DEPARTMENT/PROCESS					
Part No. <u>D412-664-209</u>		Rework ☒		Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐		
NCR No. <u>15-5296</u>		Scrap ☐		Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐		
		Use-as-is ☐		Thermoforming ☐	Finishing ☒	Rec/Store/Packaging ☐	Other ☐		
		Suspected Unapproved ☐		Large Fab ☐	Composite ☐	Supplier ☐			
Date: <u>15-08-05</u>	Step #: <u>204</u>			QTY Effective: <u>1</u>			MRB (QSI042) Approval <u>See Work Page</u> <u>See Page #</u>		
Description Work Order Deviation				Disposition					
While a lodine tube one felt in tube and scratch it and leave mark (Position wrong) RC Operator				#2- Buff out the marks and realodine #3 Re NDT the tube too make sure there are no cracks - Perform + Record wall thickness in location of mark (4 measurements) done by Alex and sign off on second page.				Completed By DAS 41 9-89 <u>15-8-5</u>	
								Lead hand Supervisor Approval <u>9-89</u> AUG 05 2015	
								QC / QA Coordinator Approval DAS 9 9-89 <u>15-08-23</u>	
Root Cause				FAULT CATEGORY					
Environment ☐	No Re-verification ☒	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☒	Positioned Wrong ☒				
Design ☐	Operator ☒	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☒				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☒				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER: <u>LOA + FD.</u>							
Misidentified ☐	Past Due ☐								

Work Order ID 135092

July 29, 2015 7:47:17 AM

135092

Page 5

Item ID: D412-664-209

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Aft Crosstube - Low Standard

Start Date: 7/29/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/12/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

206

QC7-Inspect Chemical Conversion Coat

0.00

206

QC

Memo

0.00

Quality Control

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

1

DAS
38
9-89

AUG 06 2015

210

Crosstubes

0.00

210

Crosstubes

Memo

0.00

Crosstubes

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

1

DAS
41
9-89

15-8-6

1-Rivet Cuffs as per Dwg D412-664-249. with Sika flex in Between tube & Cuff
A/R SIKAFLEX -241/-291 BATCH: 132705

exp 2/16

215

QC5- Inspect part completeness to step on W/O

0.00

215

QC

Memo

0.00

Quality Control

1

DAS
38
9-89

AUG 06 2015

Work Order ID 135092

July 29, 2015 7:47:17 AM

135092

Page 6

Item ID: D412-664-209

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube - Low Standard

Start Date: 7/29/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/12/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
220	SprayPaint	0.00							DAS 41 9-89
220						1			15-8-6
SprayPaint	Memo	0.00							
Spray Painting	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1-Prime inside and outside crosstube as per QSI 005 4.2								
	PRIMER: <u>132384</u>								
	START TIME: <u>1000</u>								
	FINISH TIME: <u>1100</u>								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PAINT: <u>132422</u>								
	Start Time: <u>300</u>								
	Finish Time: <u>400</u>								
230	QC14- Inspect Spray Paint	0.00							DAS 38 9-89
230						1			AUG 10 2015
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date : _____	Step #: _____	QTY Effective : _____		MRB (QS1042) Approval	
Description Work Order Deviation			Disposition		
			Completed By		
			Lead hand / Supervisor Approval Verification		
			QC / QA Coordinator Approval		
Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
OTHER : _____					

Work Order ID 135092

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Page 7

Item ID: D412-664-209

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N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube - Low Standard

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1

Cust Item ID:

Required Date: 8/12/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***
Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

240

0.00

240

Crosstubes

Crosstubes

Memo

0.00

1- Install center support using scoth-weld DP460 per QSI 015, as per DWG. note 15. Install supports clamps using as per Dwg D412-644-249. Install clamp with rubber cushion as per DWG. note 16. ***ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT*** Torque clamps on support to 80-100 IN-LBS AS PER DWG.

A/R scoth-weld DP460

BATCH #: 132895
EXP DATE: 8/16

2- **IF NOT ALREADY PRESENT ON CHAFFING SHEILD.** Apply a thin coat of proseal 890 per QSI 015 on inside concave surface of chafing shield and let cure per manufacturer's instructions. Install prosealed chafing shield onto crosstube by applying a thin coat of proseal 890 onto crosstube. Be sure to eliminate any air gaps. Install and torque clamps on chafing shield to 40-50 IN-LBS AS PER DWG.

A/R Proseal 890

Batch: 132226
EXP DATE: 12/15

AFTER FINISH CURE TIME 24H

START CURE TIME: 15-8-7FINISH CURE TIME: 15-8-8

PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER CURED FOR 24H.

4-Install nut plates as per Dwg D412-664-249 Touch-up rivet heads with Imron paint.

DAS
41
9-89
15-8-7

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QS1042) Approval		
Description Work Order Deviation				Disposition				Completed By	
								Lead hand / Supervisor Approval Verification	
								QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY							
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐	OTHER : _____			

Work Order ID 135092

July 29, 2015 7:47:17 AM

135092

Page 8

Item ID: D412-664-209

Accept

N900040100

Setup Start

NS1

Revision ID:

Item Name: Aft Crosstube - Low Standard

Stop

NS2

Start Date: 7/29/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/12/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

250

QC5- Inspect part completeness to step on W/O

0.00

250

QC

Memo

0.00

Quality Control

***RE-CHECK TORCQUE ON CLAMP AFTER PROSEAL HAS CURED
FOR 24 HOURS AS PER DWG.***DAS
38
9-89

AUG 10 2015

255

Pick Kit

0.00

255

Packaging

Memo

0.00

Packaging

1x 2015-08-10

260

QC4- 100% Inspect kits for completeness

0.00

260

QC

Memo

0.00

Quality Control

DAS
02
9-89

AUG 10 2015

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QS1042) Approval		
Description Work Order Deviation				Disposition				Completed By	
								Lead hand / Supervisor Approval Verification	
								QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____							
Misidentified ☐	Past Due ☐								

Work Order ID 135092

July 29, 2015 7:47:17 AM

135092

Page 9

Item ID: D412-664-209

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube - Low Standard

Start Date: 7/29/2015 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 8/12/2015 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
270		0.00							
270	Packaging								DAS
Packaging	Memo	0.00							02
Packaging	Identify and pack for shipping as per PPP D412-664-209								9-89
		66 98							AUG 10 2015
280	QC21- Final Inspection - Work Order Release	0.00							
280									AUG 11 2015
QC	Memo	0.00							MLJ
Quality Control									MLJ

AUG 11 2015

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date : _____	Step #: _____	QTY Effective : _____		MRB (QSI042) Approval	
Description Work Order Deviation			Disposition		
			Completed By		
			Lead hand / Supervisor Approval Verification		
			QC / QA Coordinator Approval		
Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
OTHER : _____					

Picklist Print

July 29, 2015 7:47:26 AM

Page 1

Work Order ID: 135092

135092

Parent Item: D412-664-209

D412-664-209

Parent Item Name: Aft Crosstube - Low Standard

Start Date: 7/29/2015

Required Date: 8/12/2015

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:A New Issue 07.09.12 EC verified by: JLM
 IPP Rev:B ECN 1100 08-01-11 DD verified by EC
 IPP Rev:C ECN 1121 08-02-25 DD verified by:EC
 IPP Rev:D 08-06-12 add comment in seq. 24 DD verified
 by:EC
 11.10.03 DEO D412-664-249-B-2 DD verf:EC

IPP REV:E

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

NAS1149D0663J

Purchased

No

100

Each

1,367.000

18

18

NAS1149D0663.J

Washer

**DAS
02
9-89**

Location

Loc Qty

Loc Code

ST260

300

M131618

300

ST260a

1000

M132256

1000

ST269

67

M126334

67

D412-664-209TRN

Manufactured

No

140

Each

0.0000

1

D412-664-209TRN

Crosstube Turning Detail

D3660-1

Manufactured

No

220

Each

12.0000

2

2

D3660-1

Cuff

Location

Loc Qty

Loc Code

ST509

12

113140

3

121057

2

130601

2

133147

4

95844

1

**DAS
26
9-89**

1507.29

13L 15/07/30

Picklist Print

July 29, 2015 7:47:26 AM

Page 2

Work Order ID: 135092

135092

Parent Item: D412-664-209

D412-664-209

Parent Item Name: Aft Crosstube - Low Standard

Start Date: 7/29/2015

Required Date: 8/12/2015

Start Qty: 1.00

Required Qty: 1.00

CR3212-4-07

Purchased

No

240

Each

475.0000

44

44

DAS

41

9-89

15-8-6

CR3212-4-07

CHERRY RIVET

Location

Loc Qty

Loc Code

ST320

475

m131800

6

m132249

469

44

D2896-1

Manufactured

No

240

Each

11.0000

1

1

DAS

41

9-89

15-8-7

D2896-1

Support

Location

Loc Qty

Loc Code

LG052

2

115385

2

1

LG053

9

129585

9

2

D3189-1

Manufactured

No

240

Each

19.0000

2

2

DAS

41

9-89

15-8-7

D3189-1

Chaffing Shield

Location

Loc Qty

Loc Code

FG

2

36065

2

LG053

17

134617

17

2

Picklist Print

July 29, 2015 7:47:27 AM

Page 3

Work Order ID: 135092
 Parent Item: D412-664-209
 Parent Item Name: Aft Crosstube - Low Standard

135092
D412-664-209

Start Date: 7/29/2015

Required Date: 8/12/2015

Start Qty: 1.00

Required Qty: 1.00

D3595-063-570

Manufactured No

240 Each

86.0000

2 2

DAS

41

9-89

15-8-7

D3595-063-570

Rubber Cushion 0.63" wide x 5.70" Long

**

Location

Loc Qty

Loc Code

FG

12

42243

12

LG051

74

115707

28

116260

46

2

MS21920-28

Purchased No

240 Each

157.0000

4 4

DAS

41

9-89

15-8-7

MS21920-28

Clamp

**

Location

Loc Qty

Loc Code

FG

1

105884

1

LG050

60

131651

8

M130400

50

M130665

2

LG051

96

M132169

38

M132381

20

M132522

38

4

MS21920-30

Purchased No

240 Each

48.0000

2 2

DAS

41

9-89

15-8-7

MS21920-30

Clamp

**

Location

Loc Qty

Loc Code

LG

25

m131689

25

LG050

23

m128827

23

2

July 29, 2015 7:47:27 AM

Shop Packet Print

Page 3

Picklist Print

July 29, 2015 7:47:27 AM

Page 4

Work Order ID: 135092

135092

Parent Item: D412-664-209

D412-664-209

Parent Item Name: Aft Crosstube - Low Standard

Start Date: 7/29/2015

Required Date: 8/12/2015

Start Qty: 1.00

Required Qty: 1.00

AN6-40A

Purchased

No

260

Each

144.0000

4

4

AN6-40A

3/8-24 BOLT X 3" LONG

DAS
02
9-89

Location

Loc Qty

Loc Code

ST286A

144

M131618

44

M131803

100

AN6-41A

Purchased

No

260

Each

85.0000

2

2

AN6-41A

Bolt

DAS
02
9-89

Location

Loc Qty

Loc Code

ST286A

65

M129913

5

M131957

60

ST333

20

M131618

20

MS21042L6

Purchased

No

260

Each

293.0000

6

6

MS21042L6

Nut

DAS
02
9-89

Location

Loc Qty

Loc Code

ST260a

75

m132262

75

ST273A

200

m131624

200

ST305

1

m129909

1

t260a

17

m131317

17

AUG 10 2015

DAS
02
9-89

July 29, 2015 7:47:27 AM

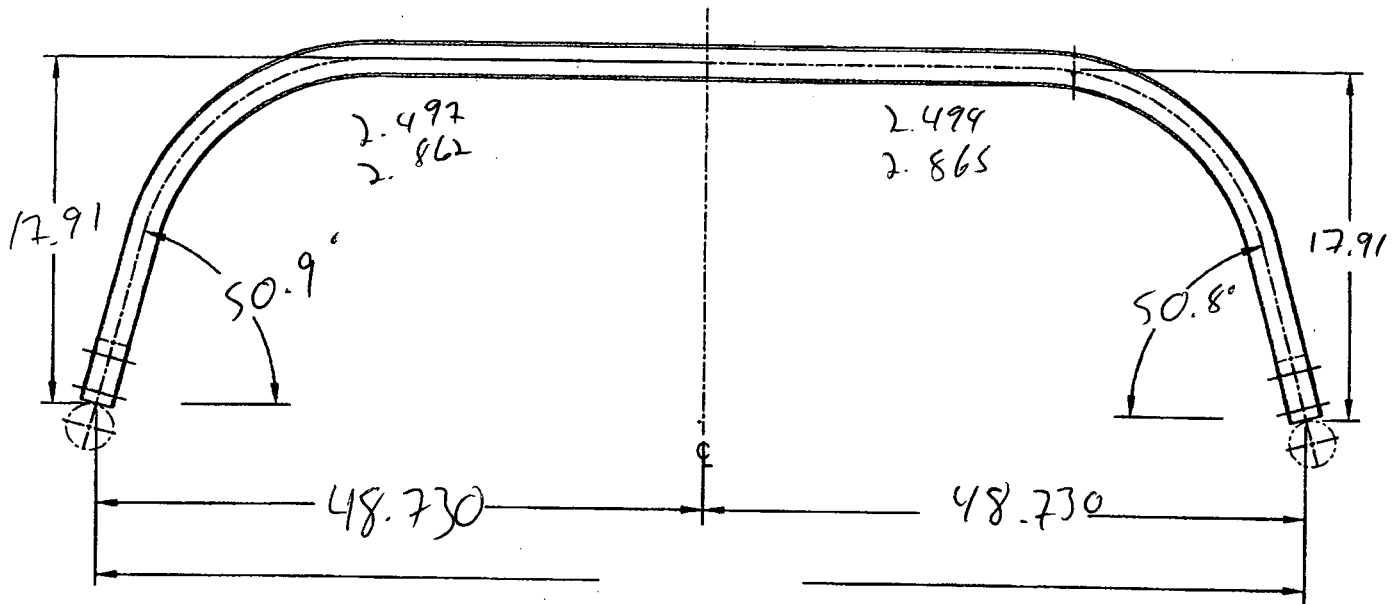
Shop Packet Print

Page 4

54 20150729

DART AEROSPACE LTD		Work Order:	135092
Description: Crosstube Low Aft (412)		Part Number:	D412-664-209
Inspection Dwg: D412-664-249 Rev: C		Page 1 of 1	

Required Dimension	Min	Max
Height	17.78	18.04
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62
Bending Passes	8	--
Crushing	--	6% / 10%



	Side A	Side B
Bending Passes	15	11
Crushing	6.8%	6.9%
Comments		

QC15 Inspection	EB
Date	15-07-30

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	12.04.16	Added bending, crushing dimensions	KJ	
C	15.04.14	Dwg Rev updated	KJ	

Item	Qty -249	Part Number	Description
1	X	D412-664-249	CROSSTUBE ASSEMBLY (412 LOW AFT)
2	1	D6009-129	CROSSTUBE
3	1	D2896-1	SUPPORT
4	2	D3189-1	CHAFING SHIELD
5	2	D3595-063-570	RUBBER CUSHION
6	2	D3660-1	CUFF
7	44	CR3212-4-07	RIVET (OR M7885/3-4-07)
8	4	MS21920-28	CLAMP
9	2	MS21920-30	CLAMP (OR MS21920-32)
10	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
11	A/R	PROSEAL 890	SEALANT, MIL-S-8802 CLASS B2
12	A/R	SIKAFLEX-2417-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 127.828±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-249" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 42.5 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

TURNING

- 10) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.

BENDING

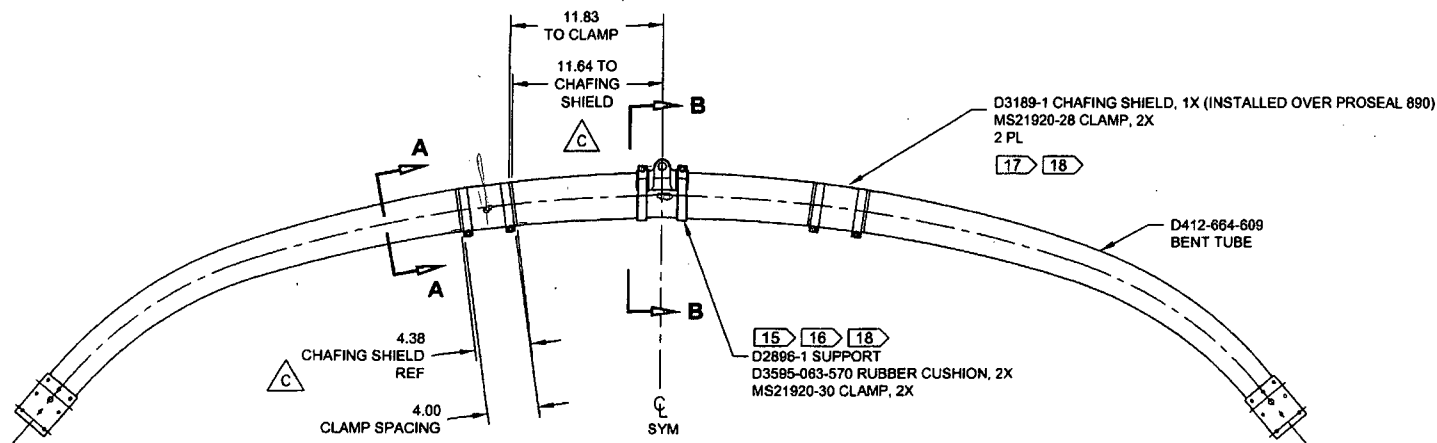
- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

ASSEMBLY:

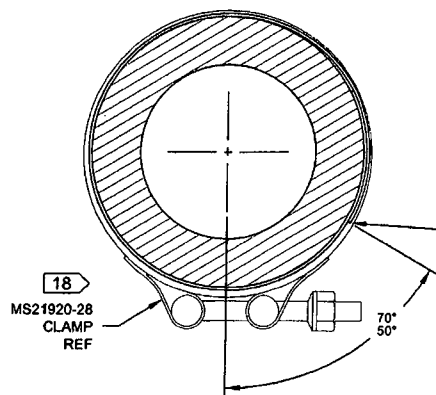
- 13) INSTALL D3660-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-2417-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 14) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.
- 15) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.
- 16) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- 17) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 18) TORQUE CLAMPS ON D2896-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

C	NOTES RE-ORDERED, SCOTCH-WELD WAS MAGNOBOND (C8-1), ADD CLAMP RETORQUE (A8-1). REMOVE ABRASION STRIP, CHAFING SHIELD NOW 4.38 WIDE (C6-2), CLAMPS FLIPPED TO PREVENT CHAFING (B7-2). INCORP. DEO B-1/2/3	CP	14.04.01
B	REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	DP	DART AEROSPACE LTD	
DRAWN	DP	HAWKESBURY, ONTARIO, CANADA	
CHECKED	AW	DRAWING NO.	REV. C
MFG. APPR.	AW	D412-664-249	SHEET 1 OF 4
APPROVED	AW	TITLE	SCALE
DE APPR.	AW	CROSSTUBE (412 LOW AFT)	NTS
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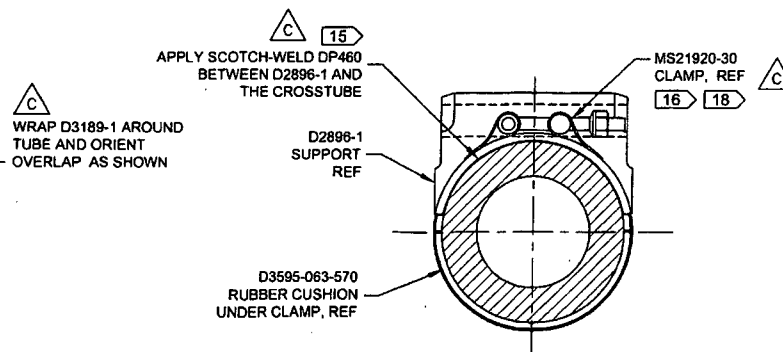
135092 RELEASED
2014-05-26
5H 20150729



D412-664-249
ASSEMBLY DETAIL



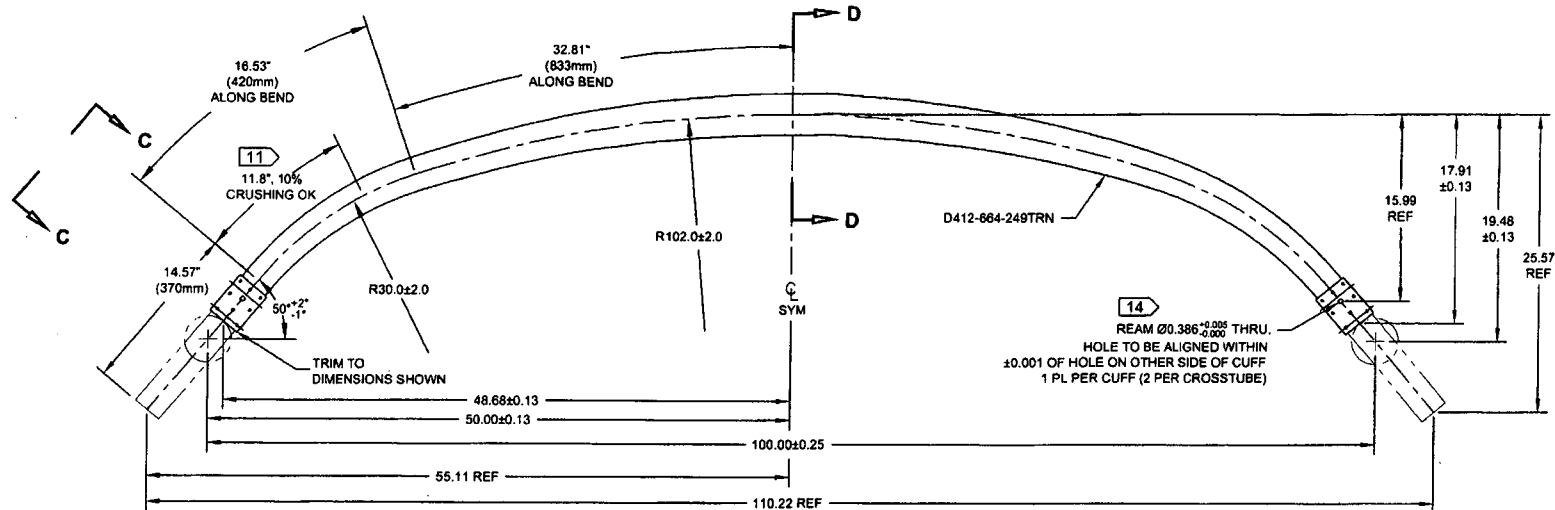
SECTION A-A D6-2
SCALE 6X



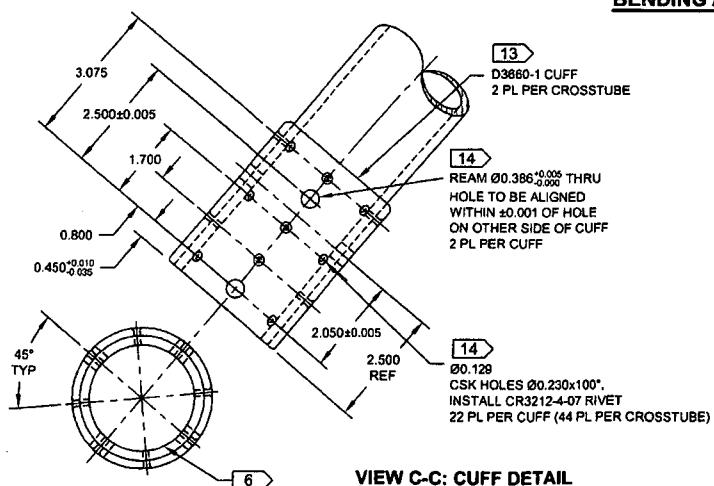
SECTION B-B
SCALE 4X

RELEASED
2014-05-26
MD

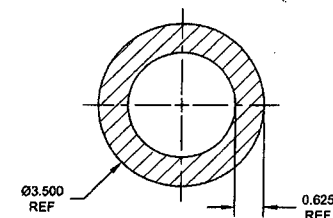
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DRAWN		HAWKESBURY, ONTARIO, CANADA
CHECKED		DRAWING NO. REV. C
MFG. APPR.		D412-664-249 SHEET 2 OF 4
APPROVED		TITLE SCALE
DE APPR.		CROSSTUBE (412 LOW AFT) NTS
DATE	14.04.01	COPYRIGHT © 2007 BY DART AEROSPACE LTD
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D412-664-609
BENDING AND DRILLING DETAIL 11



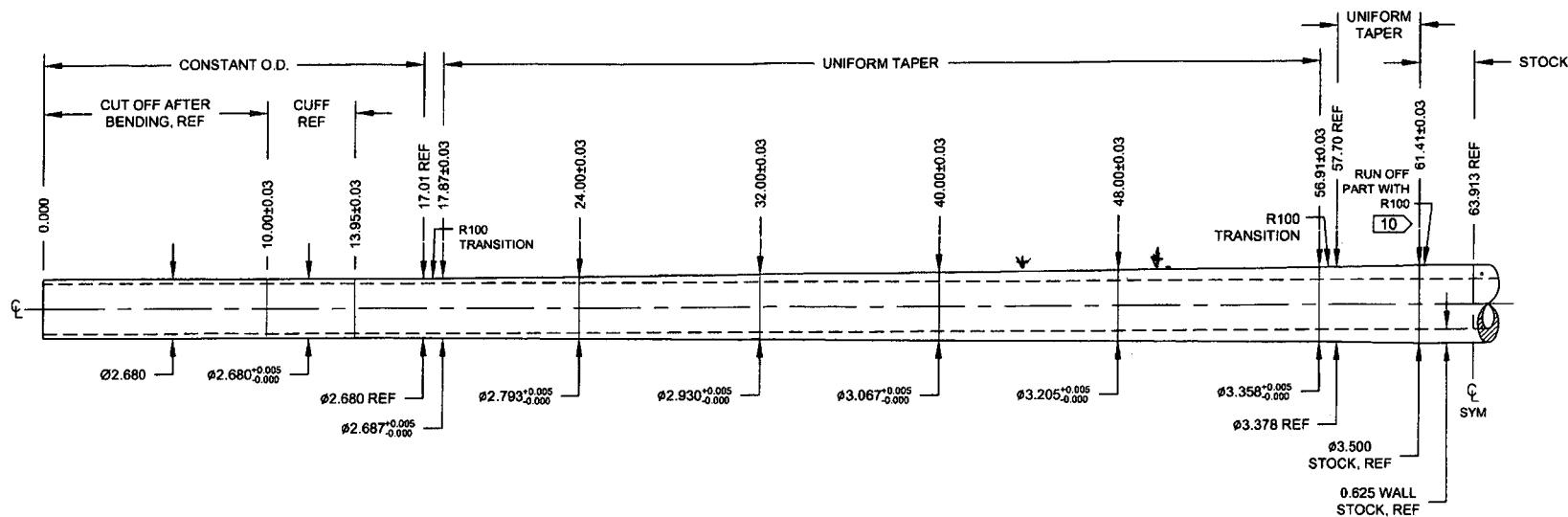
VIEW C-C: CUFF DETAIL
SCALE 4X



SECTION D-D
SCALE 4X

RELEASED
2014-05-26
NW

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO. D412-664-249	REV. C
MFG. APPR.			SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (412 LOW AFT)	NTS
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**D412-664-249TRN
TURNING DETAIL**

RELEASED
2014-05-26

DESIGN	<i>92</i>	DART AEROSPACE LTD	
DRAWN	<i>92</i>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>DW</i>	DRAWING NO.	REV. C
MFG. APPR.	<i>[Signature]</i>	D412-664-249	SHEET 4 OF 4
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DE APPR.	<i>[Signature]</i>	CROSSTUBE (412 LOW AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2007 BY DART AEROSPACE LTD	
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D412-664-209

edited (12-10-15)

Tangent Lines/Rollers:

3.5" rollers for middle/3.25" rollers for side bends

32.8" red...from CL

32.125" from cuff

15.250" from cuff

Shims ?

SI Long pause?
Return → tube not affected

Middle Bend:

Large table, **Approach: 3000/3000**, 32.8 line

Run Program M4-5-6-7-8-9-10-11-12-13-14

CHECK, Re-run 14 as required., flip tube if needed. DO NOT overbend middles, the side programs are VERY effective, and will easily overbend if middles are past reference line.

BENDER CHANGE TO 3.25" ROLLERS

Side Bends: down taper

SMALL SLUG MUST BE USED FOR SIDE BENDS. Large Table, start on 32.125" line y w

Approach: 3735/1800 Run Prog. 412 s1 - 8 CHECK with reference lines on board (stop early if middles are overbent.)

Side Bends: up taper

Large Table... start on 15.250" line **Approach: 3732/3220** y w

Run 412 s-UT 1 to 4 as required checking between each program.

Re-run same prog. if within (0.200") of being done. Up taper programs are very strong. expect a large reaction.

NOTES:

12/11/8 batch 62039 had overbent middles, stopped at s6 and s4 to achieve s8 reference line on board. then ran ut1 checked, and ut2, approaches for these programs were very tight due to us stopping the downtaper programs early. one side was overbent after ut2 (48.4375" @ max height of 18.04") we were forced to bring the opposite side in to match. one side finished at ut2, the opposite side at ut4 after running ut2 and ut3 multiple times.

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Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID PO29379

Purchase Order Date 8/5/2015

PO Print Date 8/5/2015

Page Number 2 of 2

Order From :
SKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA

VC-SKY001

Ship To : DART AEROSPACE LTD
1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name
Vendor Phone 905-678-5636

Ship To Contact
Ship To Phone
Ship Via: Delivered
Ship Acct:

Buyer Chantal Lavoie
Customer POID
Customer Tax # 10127-2607
Terms Net 30
Currency CAD
FOB FCA - (Free Carrier)

Line Total: \$300.00

3 135092

D412-664-209
CROSSTUBE

8/5/2015

1.00

\$300.00 \$300.00

Yes
8/5/2015

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

Line Total: \$300.00

PO Total: \$600.00

Note: Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Change Nbr: 4

Change Date: 8/5/2015



skyservice Work Order Traveler

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO25414	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 29379
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT ON 2 AFT CROSSTUBES AS PER PO29379.

ITEM ID# D412-664-209, WORK ORDER ID# 135091, 135092

SPK-08-05

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M-13 ***NO CRACK FOUND*** PEN. ZL-56, MPO13600, UV M-20141, CLEANER SKC-S MPO13923 , DEV. MPO11715						5/AUG 2015	
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature:	ACA/SCA Stamp	Date:
Name: RAFIK MELIKIAN		5/AUG 2015



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO29396**

Purchase Order Date 8/6/2015

PO Print Date 8/6/2015

Page Number 1 of 2

Order From :
SKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA

VC-SKY001

Ship To : DART AEROSPACE LTD
1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name
Vendor Phone 905-678-5636

Ship To Contact
Ship To Phone
Ship Via: Delivered
Ship Acct:

Buyer Chantal Lavoie
Customer POID
Customer Tax # 10127-2607
Terms Net 30
Currency CAD
FOB FCA - (Free Carrier)

Line Nbr	Reference Vendor Part Number Line Comments Delivery Comments	Description/ Mfg ID	Req Date/ Taxable Promise Date	CD	Req Qty/ Unit of Measure	PO Unit Price	Extended Price
1	71401-45	PROCUREMENT QUALITY CLAUSES	8/6/2015		1.00	\$0.00	\$0.00
			No 8/6/2015				
	PROCUREMENT QUALITY CLAUSES A005 RIGHT OF ENTRY A016 PERSONNEL QUALIFICATION A020 NON - DESTRUCTIVE TEST/INSPECTION IDENTIFICATION A041 QUALITY MANAGEMENT SYSTEM A042 DART NOTIFICATION BY SUPPLIER A043 RETENTION OF QUALITY DOCUMENTS						

Line Total: \$0.00

2	135092	D412-664-209 CROSSTUBE	8/6/2015		1.00	\$250.00	\$250.00
			Yes 8/6/2015				
	LIQUID PENETRANT INSPECTION AS PER QSI 038 OR LPI AS PER ASTM 1417 LEVEL 2						

DIS-OF-OL

Note:

8/6/2015



skyservice Work Order Traveler

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO25423	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 29396
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT ON 3 CROSSTUBES AS PER PO29396

1 AFT CROSSTUBE, ITEM ID# D412-664-209, WORK ORDER ID# 135092
2 STAINLESS STEEL AFT CROSSTUBES, ITEM ID# D412-596-203, WORK ORDER ID# 135061, 135062

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M-13 ***NO CRACK FOUND*** PEN. ZL-56, MPO13600, UV M-20141, CLEANER SKC-S MPO13923, DEV. MPO11715						6/AUG 2015	
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	

SPF-08-06

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature:	ACA/SCA Stamp:	Date: 6/AUG 2015
Name: RAFIK MELIKIAN		